Author index

Adams, S. E., see Kingsman, A. J. 303
Adlercreutz, P., see Mattiasson, B. 394
Altman, A., Frontiers of biotechnology in agriculture 373
Arnebrant, T., see Wahlgren, M. 201
Auffray, C., Piatier-Tonneau, D. and Kroemer, G., CD4-targeted immune intervention: a strategy for the therapy of AIDS and autoimmune disease 124
Auffret, T., Stabilizing protein products: reflections on the glassy state (Letter) 265

Balcells, L., Swinburne, J. and Coupland, G., Transposons as tools for the isolation of plant genes 31
Bally, M. B., see Cullis, P. R. 268
Binnie, C., Designing the optimal oligo 145
Bird, R. E. and Webb Walker, B., Single-chain antibody variable regions 132
Björkling, F., Godtfredsen, S. E. and Kirk, O., The future impact of industrial lipases 360
Blenkinsopp, S. A. and Costerton, J. W., Understanding bacterial biofilms 138
Blumenthal, R. and Loyter, A., Reconstituted viral envelopes – 'Trojan Horses' for drug delivery and gene therapy? 41
Braun, S. and Vecht-Lifshitz, S. E., Mycelial morphology and metabolite production 63
Brill, W. J., Beyond Mendel's Garden: Biotechnology in the Service of World Agriculture (Book Review) 257
Browne, M. J., see Robinson, J. H. 86
Brunke, K. and Meeusen, R. L., Insect control with genetically engineered crops 197
Bryant, J. A., Plant Biotechnology Series, Vol. I Plant Genetic Engineering; and Vol. II Developmental Regulation of Plant Gene Expression (Book Reviews) 446
Bryant, J. A., Nitrogen-fixation in plants: can *Rhizobium* live with non-legume crops? 79
Bryers, J. D., Understanding and controlling detrimental bioreactor biofilms 422
Bülow, L. and Mosbach, K., Multienzyme systems obtained by gene fusion 226
Burns, N. R., see Kingsman, A. J. 303
Burton, D. R., Human and mouse monoclonal antibodies by repertoire cloning 169

Costerton, J. W., see Blenkinsopp, S. A. 138
Coulet, P. R., Bioinstrumentation – Research, Development and Applications (Book Review) 443
Coupland, G., see Balcells, L. 31
Cox, F. E. G., Malaria vaccines – progress and problems 389
Crabbe, M. J. C., Enzyme Technology (Book Review) 144
Crespi, R. S., Biotechnology and intellectual property; Part 1: Patenting in biotechnology 117
Crespi, R. S., Biotechnology and intellectual property; Part 2: Microorganism deposit questions and agricultural biotechnology issues 151
Crittenden, P. D. and Porter, N., Lichen-forming fungi: potential sources of novel metabolites 409
Cullis, P. R., Bally, M. B., Madden, T. D., Mayer, L. D. and Hope, M. J., pH gradients and membrane transport in liposomal systems 268

Daker, M. G., Chromosome Banding (Book Review) 335
de Graaf, F. K., Biotechnology and sustainable development in the Third World 297
De Magistris, M. T., see Rappuoli, R. 232
Dorin, J. and Porteous, D. J., Cystic fibrosis – the way forward from the gene 48
Dougan, G., Gene Probes for Bacteria (Book Review) 212
Dover, G. A., Molecular Systematics (Book Review) 438
Draper, J., Genetic Engineering of Crop Plants (Book Review) 175
Duine, J. A., Cofactor engineering 343

Elbein, A. D., The role of *N*-linked oligosaccharides in glycoprotein function 346
Enfors, S-O., see Huddleston, J. 381
Evans, D. J., see Rose, C. S. P. 415

Fahlesson, J., see Glimelius, K. 24
Fanger, M. and Guyre, P., Bispecific antibodies for targeted cellular cytotoxicity 375
Fay, M. F., *In Vitro* Methods for Conservation of Plant Genetic Resources (Book Review) 332
Ferguson, M., Progress towards rabies control 7
Flanagan, J., see Huddleston, J. 381
Flemming, H-C., Biofilms (Book Review) 176
Flint, K. P., Handling Laboratory Microorganisms (Book Review) 258
Florence, A. T. and Gregoriadis, G., Targeting peptides and proteins: NATO ASI 295
Fray, R. G., see Grierson, D. 122
Frenz, J. and Hancock, W. S., High-performance capillary electrophoresis 243
Friehs, K., see Kumar, P. K. R. 279
Fujii, M. and Taniguchi, M., Application of reversibly soluble polymers in bioprocessing 191

Garrett, A. J., Techniques in HIV Research (Book Review) 106
Geisow, M. J., New attempts to solve protein structures lead to MADness 4
Geisow, M. J., The proof of the cloning is in the eating 4
Geisow, M. J., Do-it-yourself molecules: chaperonin self-assembly 45
Geisow, M. J., The twists and turns of biopolymer migration 46
Geisow, M. J., Back from the future? 47
Geisow, M. J., Guide to Protein Purification: Methods in Enzymology Vol. 182 (Book Review) 69
Geisow, M. J., Public funding of research and development: a broad picture 76
Geisow, M. J., Anti-angiogenesis: towards a molecular tourniquet 78
Geisow, M. J., Binding contracts: antibody engineering 113
Geisow, M. J., From sphygmomanometers to synchrotrons: the progress of protein structure determination 115
Geisow, M. J., Life support systems for nanotechnology 148
Geisow, M. J., Stabilizing protein products: coming in from the cold 149

Geisow, M. J., Annexins – forms without function – but not without fun 180
Geisow, M. J., The coming of age of glycobiology 221
Geisow, M. J., Stabilizing proteins . . . with hybrid vigour 259
Geisow, M. J., Biosensors – a swell response to sugar 260
Geisow, M. J., The importance of being a protein scientist 293
Geisow, M. J., Peptide synthesis – theme and variations 294
Geisow, M. J., Fundamentals of Protein Biotechnology (Book Review) 331
Geisow, M. J., DNA-based drugs, diagnostics and devices 337
Geisow, M. J., Biotechnology – what does industry want from the science base? 338
Geisow, M. J., Biotechnology transfer: should administrations stimulate or steer? 367
Geisow, M. J., Both bane and blessing – inclusion bodies 368
Geisow, M. J., Unravelling the mysteries of molecular audit: MHC Class I restriction 403
Geisow, M. J., Of mice and mimics 404
Gepts, P., Biotechnology in Agriculture and Forestry, Vol. 10, Legumes and Oilseed Crops I (Book Review) 399
Glimelius, K., Fahlesson, J., Landgren, M., Sjödin, C. and Sundberg, E., Gene transfer via somatic hybridization in plants 24
Godtfredsen, S. E., see Björkling, F. 360
Gosden, J., *In Situ* Hybridization: Principles and Practice (Book Review) 399
Graeme-Cook, K., Biotechnology: A Laboratory Course (Book Review) 70
Gregoriadis, G., see Florence, A. T. 295
Grierson, D., Fray, R. G., Hamilton, A. J., Smith, C. J. S. and Watson, C. F., Does co-suppression of sense genes in transgenic plants involve antisense RNA? (Letter) 122
Griffiths, E., Environmental regulation of bacterial virulence – implications for vaccine design and production 309
Griffiths, E., Physiology of the Bacterial Cell: A Molecular Approach (Book Review) 442
Guyre, P., see Fanger, M. 375

Hamilton, A. J., see Grierson, D. 122
Hamilton, W. A., Biotechnology: Microbes and the Environment (Book Review) 37
Hancock, W. S., see Frenz, J. 243
Handa-Corrigan, A., Large-Scale Mammalian Cell Culture Technology (Book Review) 364
Harris, R., Protein Purification – Principles, High Resolution Methods and Applications (Book Review) 69
Harris, T. J. R., Catalytic antibodies – something for everyone 39
Hawkins, E., see Schwarz, T. 339
Hazlewood, G., Microbial Enzymes and Biotechnology; 2nd edn (Book Review) 401
Heaney, P., see Schwarz, T. 339
Hélène, C. and LeDoan, T., Oligonucleotides: problems and frontiers of practical applications 341
Henrissat, B., Understanding Enzymes, 3rd edn (Book Review) 444
Hilder, V. A., Agricultural Biotechnology: Opportunities for International Development (Book Review) 334
Hilvert, D., Extending the chemistry of enzymes and abzymes 11
Hobbs, G., Process Measurement and Control, Vol. 1: On-line Estimation and Adaptive Control of Bioreactors (Book Review) 400
Hope, M. J., see Cullis, P. R. 268
Huddleston, J., Veide, A., Köhler, K., Flanagan, J., Enfors, S-O. and Lyddiatt, A., The molecular basis of partitioning in aqueous two-phase systems 381
Humphreys, R. E., see Shan Lu 238
Hunter, I. S., The Bacterial Chromosome (Book Review) 105
Hutchison, C., Optical Microscopy for Biology (Book Review) 143

Ikehara, M., see Kikuchi, M. 208
Illum, L., The nasal delivery of peptides 284
Islam, S. A., see Sternberg, M. J. E. 300

Jamieson, D. J., Methods in Yeast Genetics: A Laboratory Course Manual (Book Review) 364
Jones, C. S., Japanese Biotechnology – A Comprehensive Study of Government Policy, R&D and Industry (Book Review) 439
Jorgensen, R., Beyond antisense – how do transgenes interact with homologous plant genes? (Letter) 266

Karjalainen, K., see Traunecker, A. 109
Kaufman, R. J., Developing rDNA products for treatment of hemophilia A 353
Kennedy, M. J., The evolution of the word 'Biotechnology' 218
Kennedy, M. J., The Terminology of Biotechnology: A Multidisciplinary Problem (Book Review) 330
Kikuchi, M. and Ikehara, M., Conformational features of signal sequences and folding of secretory proteins 208
Kingsman, A. J., Adams, S. E., Burns, N. R. and Kingsman, S. M., Retroelement particles as purification, presentation and targeting vehicles 303
Kingsman, S. M., see Kingsman, A. J. 303
Kirk, O., see Björkling, F. 360
Köhler, K., see Huddleston, J. 381
Kooter, J., see Mol, J. 182
Kramer, F. R., see Lizardi, P. M. 53
Kroemer, G., see Auffray, C. 124
Kumar, P. K. R., Maschke, H-E., Friehs, K. and Schügerl, K., Strategies for improving plasmid stability in genetically modified bacteria in bioreactors 279

Landren, M., see Glimelius, K. 24
LeDoan, T., see Hélène, C. 341
Lew, R. E., see Shan Lu 238
Lindmo, T., Flow Cytometry – A Practical Approach (Book Review) 105
Lizardi, P. M. and Kramer, F. R., Exponential amplification of nucleic acids: new diagnostics using DNA polymerases and RNA replicases 53
Loyter, A., see Blumenthal, R. 41
Lyddiatt, A., see Huddleston, J. 381

MacDonald, C., Living Resources for Biotechnology – Animal Cells (Book Review) 333
Madden, T. D., see Cullis, P. R. 268
Mannix, C. J., A productive mix of cultures 406
Maschke, H-E., see Kumar, P. K. R. 279
Mathias, S., Undercooling – low temperature without freezing 370
Matsunaga, T., Applications of bacterial magnets 91
Mattiasson, B. and Adlercreutz, P., Tailoring the microenvironment of enzymes in water-poor systems 394
Mayer, L. D., see Cullis, P. R. 268
McDougall, A., see Schwarz, T. 339
Meeusen, R. L., see Brunke, K. 197
Mergeay, M., Towards an understanding of the genetics of bacterial metal resistance 17
Moar, W. J., Safer Insecticides – Development and Use (Book Review) 446
Mol, J., Van Blokland, R. and Kooter, J., More about co-suppression (Letter) 182
Morris, J. G., Advances in Microbial Physiology: Vol. 31 (Book Review) 441
Mosbach, K., see Bülow, L. 226

Nash, A., Animal Virus Pathogenesis – A Practical Approach (Book Review) 441
Nencioni, L., see Rappuoli, R. 232
Northrop, D. B., Enzymes as Targets for Drug Design (Book Review) 104

Oliveri, F., see Traunecker, A. 109

Papoutsakis, E. T., Media additives for protecting freely suspended animal cells against agitation and aeration damage 316
Papoutsakis, E. T., Fluid-mechanical damage of animal cells in bioreactors 427
Paterson, R. R. M., Methods in Plant Biochemistry, Vol. 6; Assays for Bioactivity (Book Review) 445
Piatier-Tonneau, D., see Auffray, C. 124
Pickup, R. W., Genetically Engineered Organisms: Benefits and Risks (Book Review) 365
Pizza, M., see Rappuoli, R. 232
Podda, A., see Rappuoli, R. 232
Porteous, D. J., see Dorin, J. R. 48
Porter, A. G., The prospects for therapy with tumour necrosis factors and their antagonists 158
Porter, N., see Crittenden, P. D. 409
Powell, W., The Molecular and Cellular Biology of the Potato (Book Review) 290

Rappuoli, R., Pizza, M., Podda, A., De Magistris, M. T. and Nencioni, L., Towards third-generation whooping cough vaccines 232

Reid, G. A., Molecular Cloning: A Laboratory Manual, 2nd edn (Book Review) 213
Reid, I. D., Biological pulping in paper manufacture 262
Reyes, V. E., see Shan Lu 238
Robert-Baudouy, J., Molecular biology of *Erwinia*: from soft-rot to antileukaemics 325
Robinson, C. J., Tailoring and targeting fibroblast growth factors 147
Robinson, C. J., Cell-based assays – technology providing alternatives to animal testing 407
Robinson, E. C., Capturing the light and capturing the market 72
Robinson, J. H. and Browne, M. J., Redesigning t-PA for improved thrombolytic therapy 86
Rose, C. S. P. and Evans, D. J., Poliovirus antigen chimeras 415
Ruane, R. J., Modern Thin-Layer Chromatography (Book Review) 366
Russu, I. M., Studying DNA–protein interactions using NMR 96

Sandberg, W. S. and Terwilliger, T. C., Repacking protein interiors 53
Scheidegger, A., Biotechnology in Japan – towards the year 2000 . . . and beyond 183
Schügerl, K., see Kumar, P. K. R. 279
Schwarz, T., Yeung, D., Hawkins, E., Heaney, P. and McDougall, A., Detection of nucleic acid hybridization using surface plasmon resonance 339
Shan Lu, Reyes, V. E., Torgerson, R. R., Lew, R. E. and Humphreys, R. E., Common principles in protein folding and antigen presentation 238
Shaw, C. H., Biotechnology of Plant–Microbe Interactions (Book Review) 38
Shepard, L. Y., The competitive market for antiplatelets and thrombolytics: can a new entrant succeed? 80
Sherwood, R., Protein fusions: bioseparation and application 1
Sjödin, C., see Glimelius, K. 24
Smith, C. J. S., see Grierson, D. 122
Spurr, N. K., Advances in Human Genetics (Book Review) 333
Staeheli, P., Intracellular immunization: a new strategy for producing disease-resistant transgenic livestock? 71
Stern, P. S., Predicting antigenic sites on proteins 163
Sternberg, M. J. E. and Islam, S. A., Protein sequences – homologies and motifs 300
Sudbery, P., Gene Cloning, 2nd edn (Book Review) 212
Sullivan, K. M., DNA Fingerprinting – An Introduction (Book Review) 215
Summers, D. K., The kinetics of plasmid loss 273
Sundberg, E., see Glimelius, K. 24
Swain, W. F., Antibodies in plants 107
Swinburne, J., see Balcells, L. 31

Takabayashi, K., Protein Engineering in Focus (Book Review) 444
Taniguchi, M., see Fujii, M. 191
Terwilliger, T. C., see Sandberg, W. S. 59
Torgerson, R. R., see Shan Lu 238
Traunecker, A., Oliveri, F. and Karjalainen, K., Myeloma-based expression system for production of large mammalian proteins 109

van Blokland, R., see Mol, J. 182
van der Putten, H., Genes and Cancer (Book Review) 291
Van Rie, J., Insect control with transgenic plants: resistance proof? 177
Vecht-Lifshitz, S. E., see Braun, S. 63
Veide, A., see Huddleston, J. 381

Wahlgren, M. and Arnebrant, T., Protein adsorption to solid surfaces 197
Watson, C. F., see Grierson, D. 122
Watt, B., Anaerobic Bacteria (Book Review) 292
Webb Walker, B., see Bird, R. E. 132
Wilmut, I., Postimplantation Mammalian Embryos – A Practical Approach (Book Review) 214
Wilson, I. D., Planar Chromatography in the Life Sciences: Chemical Analysis Monographs Vol. 108 (Book Review) 331

Yeung, D., see Schwarz, T. 339

Zurawski, G., Analysing lymphokine–receptor interactions of IL-1 and IL-2 by recombinant-DNA technology 250

Subject index

A
Abzymes 11, 115
Acellular vaccines: against pertussis 233
Accessory molecules 377
Acquired immunodeficiency syndrome (AIDS) 124
(see also AIDS, HIV)
Actin-network disruption 433
Actinomycete products 409
Actinomycetes: aggregation patterns 65
Active partitioning of plasmid loss 277
Activation of factor VIII 355
Activator transposon (*Ac*) 34
Acute myelogenous leukemia (AML) 379
Acyl exchange in triglycerides 361
Adaptamer 337
Additives: for shear protection of cells in bioreactors 316, 435
Adhesion molecules 377
Adhesion:
of bacteria in biofilms 139
intercellular 35
'Adhesive' glycoproteins 224
Adsorption kinetics 203
Aeration damage to cells in culture 316, 428
Aerobactin 314
Affinity handle 1, 230
Affinity labeling 15
Affinity precipitation 191
Aggregation
of cells in culture 65
of enzymes 227
of proteins 149
Agitation damage to cells in culture 316, 428
Agricultural biotechnology 151, 373
Agonism: partial and selective 255
AIDS
and TNFs 161
prevention 129
therapy 124
vaccine development 419
virus: inhibitor 349
Air-bubble entrainment 433
Air-lift bioreactors 428
Algorithms 239
for predicting antigenicity 164
search 302
strip-of-helix 165
structural helices 241
Aliphatic amino acid side chains: models 59
Allopolyploid hybrids 25
Amino acids:
as cofactors 345
distribution in *E. coli* proteins 387
Amperometric biosensors 345
Anaerobic consortia 140
Anchorage-dependent cells 427
Angina 81
Angiostatics 78
Animal cells:
in culture 406
freely suspended 316
Animal-genome-cloning experiments 6
Animal testing: alternatives to 407
Annexins 180
Anomalous diffraction 4
Anti-angiogenesis 78
Antibacterial agents 411
Antibiotic resistance: as a selective mechanism 280
Antibodies
and patenting 121
anti-idiotypic 7, 114, 129
anti-squamous-cell carcinoma 92
bispecific 90, 376
catalytic 16, 39, 107, 114
chemically crosslinked 376
chimeric 109, 328, 379
engineered 113
fibrin-specific 89
hypervariable regions of 132
in plants 107
production of 328
semisynthetic 16
single domain 170
structure 134, 170
tetanus toxoid 173
trispecific 376
(see also immunoglobulin, monoclonal antibodies, polyclonal antibodies)
Antibody–antigen complexes 39, 114, 167
Antibody
blockade 378
combining sites 15
fragments 134
genes, in bacteria 169
repertoires 134, 169
variable domains 109, 113, 124, 132
Antibody dependent cellular cytotoxicity (ADCC) 129, 375
Antibody-directed enzyme prodrug therapy (ADEPT) 3
Antibody–enzyme conjugates 3
Anticoagulants 82
Anti-fluorescein ScFv 136
Antifungal agents 411
Antigen
cell-surface 124
chimeras: poliovirus 415
human ovarian carcinoma 379
malaria 391
panning 171
presentation 238, 303
recognition by T cells 125
structure 113
Antigen presenting cells (APCs) 125
Antigenic determinants for HIV-1 419
Antigenic index 165
Antigenic peptides, helical folding of 238
Antigenic sites 163
Antigenicity
of poliovirus 415
prediction of 164
Anti-inflammatory factor 180
Antileukaemics 325
Antiplatelets 80
Antisense hypothesis (Letter) 266
Antisense oligos 342
Antisense RNA 5, 337
(Letters) 122, 182, 266
Antithrombotics 80, 83
Antitumour agents 160, 411
Antiviral agents 128, 338
Antiviral protection: in transgenic mice 71
Antivirus–anticell, hybrid molecules 43
Apothecia 413
Aptamer technology 337
Aquaphilicity (*Aq*) 396
Aqueous two-phase systems 381
Arthritis: and TNFs 161
Artificial multienzyme systems 231
Artificial redox enzymes 15
Ashwell receptor 224
Asialoglycoprotein receptor (ASGPR) system 351
L-Asparaginase, production of 328
Asparagine-linked oligosaccharides 347
Aspergillus 64
ATPases: eukaryotic 20
Attenuated total reflection (ATR) 142, 425
Autoimmune disease (see AIDS)
Avian leukosis virus 307
resistance to 71

B
Bacillus thuringiensis 177
Backcrossing: of fertile *Brassica* hybrids 26
Bacteria
entomocidal 197
lactic acid 372
magnetic 91, 148
manipulated 154, 279
regulatory systems 311
virulence 309, 328
virulence genes 314
(see also microorganisms)
Bacteria–metal interactions 17
Bacterial
biofilms 138, 422
cloning vectors, instability of 273
endotoxin 161, 197
luciferase 72, 229
metal resistance, genetics of 17
pathogenicity 310
soft-rot 325
Bacterial expression systems 109
for antibody genes 169
Bacteriocins: and plasmid-free cells 277
Bacteriophage lambda repressor: cI857 274
Bacteriophage P22 tailspike protein 369
Bacteriostatic silicone pre-treatment of reactor surfaces 426
Ball-and-stick models: of aliphatic amino acid side chains 59
Barnase 60, 259
Base pairing 337
Basic science research 367
Batch processes 406
B-cell epitopes 164
Bifunctional enzymes 227
Bikaverin 67
Bioadhesive microspheres 288
Biocatalysts: industrial 360
Biocatalytic systems 394
'Biochip' project 187
Biocides 138
Bioelectrochemistry 345
Bioesters 362
Biofilm-removal processes 423
Biofilms: bacterial 138, 422
Biofilters 374
Biofouling 423
Bioleaching: of ores 22
Biological materials, stability of 370
Biological pulping 262
Bioluminescence, applications of 72
Biomarkers 142
Biomaterials 206
Biomechanical pulping 262
Biomethylation 21
Biomineralization 22
Biomining 17
Biopolymer assembly 46
Bioprocessing 191, 280
Bioreactors 427
agitated or aerated 316, 428
air-lift 428
and detrimental biofilms 422
and genetically modified bacteria 279
mixed 427
rotating drum 263
(see also fermentation processes, fermenters)
Bioremediation: of waste 23
Biosensors 260, 339
and bacterial magnets 93
Bioseparation 1
Biotechnology
in agriculture 373
industry and science base 338
definition of 218
transfer 367
Biotransformations 21
BiP 107, 357
Biphasic systems 382
Bispecific antibodies (BsAbs) 90, 375
therapeutic potential of 380
Black-leg resistance 28
Blanose 322
Blood clotting 312, 353
Boosters for poliovaccines 420
Bordetella pertussis 232
Bradyrhizobium: and non-legume crops 80
Brassica hybrids 26
Brightness reversion 262
Britannia and EC science funding 47
Broad-host-range (BHR) plasmids: from *T. ferrooxidans* 17
Brookhaven database 300
Bt-protected crops 198
Bt toxin gene 198, 374
Bubble-column reactors 316, 433
B-values 165

C
Cachexia 79, 158
Chalcone synthase (CHS)
(Letter) 122
(Letter) 266
Calcium dependence of *Yersinia* 311
Calcium-dependent membrane-binding proteins 180
Calcium flux inhibition 131
Calelectrin 180
Calgranulins A and B 51
Cancer
and bispecific antibodies 375
and lymphokines 250
and radioactive liposomes 272
and TNFs 160
diagnosis 134
Capillary electrophoresis (CE) 294
Capillary zone electrophoresis (CZE) 243
Capsid proteins: virus 415
Capsule coating 296
Capture probes 56
Carbohydrases 360
Carbohydrate: and glycoprotein function 350
Casein, adsorption of 207
Casein–enzyme conjugates 194
Cassette for gene expression 110
Cassette mutagenesis 239, 252, 417
Castanospermine 349
Catalytic antibodies 16, 39, 107, 114
Catalytic mechanisms 344
Catalytic triad: in lipases 361
Cation accumulation 272
cDNA constructs 417
CD4 307
binding 418
targeted drugs 128
targeted immune intervention 124
Celite-bound chymotrypsin 397
Cell adhesion: in culture 65
Cell adhesion molecules (CAMs) 224, 351
neural 377
Cell-based assays 407
Cell–cell interaction 225, 351
Cell culture technologies 324, 406, 427
and undercooling 372
Cell disruption 381
Cell division: and plasmid fate 273
Cell-free glycosylation system 351
Cell injury 427
Cell-surface antigens 124
Cellular cytotoxicity 375
Cellular vaccines: against pertussis 236
Cellulolysis 326
Cerebral malaria 161, 392
Cerebrovascular disease 81
Channel flows 432
Chaperonins 45, 73, 107
Charge-based separations 248
Charge-coupled device (CCD) 75
Chemical conjugation 89
Chemical modification: of enzymes 11, 227
Chemical pulping 262
Chemical shifts 96
Chemiluminescence: applications of 72
Chemostats and biofilms 424
Chemotherapeutic agents 160
Chimeras: poliovirus antigen 415
Chimeric
antibodies 109, 328, 375
genes 227
plasmid 229
proteins 111, 376
Chitosan 195
CHO cells 351, 356, 406
Chromosome
damage 408
variability 27
Chloroplast
and mitochondria 29
membranes 271
Chrysobactin 327
Chymosin: recombinant 5
Circular dichroism (CD) 210, 396
Circulatory-assist devices 432
Circumsporozoite (CS) protein 390
Clot-lysis mechanism 86
CoA ligase: in plants 73
Coagulation factors 87
Coat-protein-mediated resistance of plants to viruses 373
Coated capillaries 243
Coenzymes 343
Cofactor engineering 343
Cold lability (Letter) 266
Colicin 277
Colony stimulating factors (CSFs) 250, 378
Combinatorial approach
to cassette mutagenesis 253
to repertoire cloning 170
Combinatorial associations 40
Complement system: human 375
Complementarity determining region (CDR) 113, 169, 404
Computer algorithms 165
Concanavalin A (ConA) 260
Confluent cell 'membrane' 408
Conformational stability of protein chains 149
Conjugation: using magnetic particles 95
Continuous fermentation 193
Continuous production processes 406
Copper–oxo complex 14
Copy-number control 275, 281
Co-receptor hypothesis 126
Correlation spectroscopy (COSY) 97
COS cells 306, 351
Cost-effective support for biotechnology 368
Co-suppression (Letters) 122, 182
Couette viscometer 318, 432
Coumadins 84

Covalent modification of enzymes 398
Crabtree effect 282
Crossover concentration 386
Culture collections 118, 152
Culture growth parameters 425
Custom peptides 295
Cybrid production 29
Cycloaddition: Diels-Alder 16
Cyclooxygenase inhibitor 161
Cystic fibrosis (CF)
  gene 48
  population screening for 158
Cytokines activation of 377
Cytokinins 373
Cytoplasmic male sterility (CMS) 26
Cytoplasmic traits, improvement of 29
Cytotoxic mechanisms 375
Cytotoxic reagents: to HIV-infected cells 127
CzcABC protein complex 21

D
Damage to cells: in culture 427
Danish bat virus: and rabies vaccines 7
Databases: and protein sequence 300
Debye shielding 385
Delivery of macromolecules to cells, using RVEs 43
Deoxyinosine (dI) 146
Deoxynojirimycin 349
Dendritic polynucleotides 341
Deposit: of biological material 118, 152
Desetope 239
Desorption of adsorbed protein 204
Detection: of biofilms 425
Detergent–lipid and detergent–protein mixed micelles 42
Deterioration: of biological material 370
Dextran 286, 383
DHFR gene 356
Diagnostic assays 53, 121
Diels-Alder cycloaddition 16
Differential scanning calorimetry (DSC) 370
Dihydroflavonol-4-reductase: in petunia (Letter) 122
Dihydrofolate reductase (DHFR) 356
Dimer distribution: and plasmid loss 273
Diphtheria toxin 43
  synthesis 312
Disease-resistant livestock 71
Displacement electrophoresis 245
D-loop formation 14
DNA 337
  and protein fusions 1
  base pairing 337
  extrachromosomal 279
  inserted 281
  NMR spectra of 98
  patents 156
  sequencing 246
DNA-based devices 337
DNA-binding proteins, NMR spectra of 98
DNA gyrase 278
DNA hybridization, detection of 340
DNA polymerases: as diagnostics 53
DNA probes 48, 339
DNA–protein complexes 102, 277
DNA–protein interactions 96
DNA/RNA transfer: using microprojectiles 94
DNA screening 49
Double transfection of animal cells 406
Down-regulation of gene expression (Letter) 122
Downstream processing 382
Doxorubicin 270
Drosophila: variegation alleles (Letter) 266
Drug delivery
  and liposomes 268, 296
  and RVEs 41
  nasal 284
  systems 295
Drug-discovery strategies 409
Drug-marked cell lines 376
Drugs
  agonist and antagonist 409
  antimalarial 389
  design of 405
  DNA based 337
  screening 405
  (see also drug delivery)
DUS criteria 155

E
E. coli proteins, distribution of amino acids in 389
Ectoenzymes 222
Ectopic pairing (Letter) 267
Ectoproteins 224
Eddies, cascade of 428
Edifas 322
EF hand: calcium binding 181
Electron microscopy
  and biofilms 141
  and cytoplasmic IBs 368
  and LUVs 269
Electron paramagnetic resonance (EPR) 397
Electropherograms 244
Electrophoresis: techniques 243
Electroporation 197
Electrospray 244, 295
Electrostatic behaviour: of proteins 384
ELISA 230, 369, 418
Embryo rescue techniques in plants 25
Eminase (anistreplase) 81, 88
Enabling disclosure: in patent 152
Enantioselectivity 344, 362
Endotoxic shock 162
Energetic considerations: of protein–protein interactions 115
Energy source: long-chain fatty acids 362
Engineering
  of enzymes 260
  virus-resistant plants 373
  (see also genetic engineering)
Enhancer system: for drug absorption 287
Enteral nutrition 362
Enteric coating polymers 192
Entomocidal bacterium 197
Environmental issues: and biotechnology 373
Enzyme–antibody conjugates 3
Enzyme design: cofactor mediated 345
Enzyme electrode 260
Enzyme–inhibitor complex 115
Enzyme–magnet conjugates 93
Enzyme–PEG conjugates 398
Enzyme–polymer conjugates 12, 191
Enzymes
  as biological amplifiers 261
  as drugs 12
  chemistry, and modification of 11
  engineering of 12, 259
  extracellular 326
  fungal, production of 66
  immobilized 191, 226, 396
  in organic solvents 394
  long-term stability of 371
  magnetic 92
  pectinolytic 325
  polyfunctional 227
  process technology 226
  production of 150
  redox forms 345
  ribosomal 369
  unfoldase 239
Epidermal-growth-factor receptor 351
Epithelial membrane: transport through 285
Epitopes 163, 238, 358
  mapping 127
  presentation systems 415
Epoxidation of alkenes 363
EPR spin probes 397
ERA strain of rabies virus 9
Ergot alkaloids 409
Erwinia 325
Erythropoeitin (EPO) 223, 406
Escape mutants 415
Esterification 362, 412
Ethanol production: continuous reactor system 195
European Laboratory Without Walls (ELWW) 325
European patent convention 151
European Society for Animal Cell Technology 406
Exoantigens 392
Exopolymers 422
Exponential amplification systems: for nucleic acids 53
Expression vectors 110
Extracellular enzymes, secretion of 326
Extraction procedures 381

F
Fab
  fragments 134
  libraries 171
F-actin 181
Factor VII 119
Factor VIII, recombinant 355
Factor Xa 305
Farmers' rights proposal 299
Farming, small scale: and biotechnology 297
Fast-atom bombardment (FAB) 244
Fat emulsions 362
Fed-batch culture strategy 282
Fermentation processes
  continuous 193
  of wood chips and lignin-degrading fungi 264
  on-line sampling 339
  microorganism aggregation/dispersion in 66
Fermenters
  monitoring biofilm formation 425
  viscous stirred tank 64
  (see also bioreactors)
Ferritin 149
Fibrin 89, 353
Fibroblast growth factors (FGFs) 147, 225
Ficoll–dextran separation systems 385
Filamentous hemagglutinin (FHA) 233
Film drainage 435
Finger domain: of t-PA 86
Firefly luciferase 73
First-order decay: of factor VIII activity 355
Flag™ peptide 2
Flavin cofactors 344
Flow dimensions 429
Fluidized-bed reactors 406, 425
Fluid-mechanical damage: to cells in

culture 316, 427
Fluorescence microscopy: and RVEs 42
Fluorescent molecular probes 141
Foams: in bioreactors 318
Food
contaminants 408
production and biotechnology 373
FORTRAN program: PROMOT 301
Fouling: of bioreactors 138, 201
Fowl plague resistance 71
Fourier transform infra-red (FTIR) spectroscopy 142, 425
Freely suspended cells 427
Freeze concentration 372
Freeze-drying 150, 370
(Letter) 265
Free-zone electrophoresis 244
French press: cell disruption 92
Fumagillin 79
Funding 76, 367
Fungal diversity 410
Fungi
aggregation patterns 65
ligninolytic 262
lichen-forming 409
nutrition modes 410
Fused-enzyme systems 228, 259
Fusion genes 89, 226, 303, 326
Fusion-mediated microinjection, using RVEs 43
Fusion proteins 1, 136, 376

G

Galactose receptor 224
β-Galactosidase 381, 386
gene 342
Galactosyltransferase 351
Gangliosides 128
Gas chromatography-mass spectrometry (GC-MS) 223
Gas entrainment 428
Gas–liquid interfaces 323
Gel-filled capillary electrophoresis 244
Gel filtration chromatograms of oligosaccharides 224
Gel technology 46
Gene
for Bt endotoxin 198
for cystic fibrosis 48
for ScFvs 132
fusion 89, 226, 303, 326
isolation in plants 31
patenting 156
tagging 374
targeting: in mouse ES cells 50
Gene inactivation
by transposon insertion 31
(Letter) 122
Gene therapy 308
and RVEs 41
for CF 52
Gene transfer 358
and bacterial magnetites 91
in fish 374
via somatic hybridization in plants 24
Gene vectors 109
Agrobacterium tumefaciens 197
Genefund: international 299
Genetic basis for insect resistance: in plants 179, 197
Genetic changes in plants, animals and microorganisms 7
Genetic diversity: in rapeseed 24
Genetic engineering
agricultural 154
and bacterial virulence 314
and Bt toxin gene 198
and enzyme stability 259
and nitrogen fixation 79
and (potential) bispecific antibodies 376
as a new technology 219
of antibodies 109
of bacteria 17, 279
of crops 24
of factor VIII production 356
of livestock 5, 71, 374
of lymphokines 251
of maize 154
of pertussis 232
of plants: insect resistance 179, 197
techniques 406
Genetic modification (see genetic engineering)
Genetic resources 299
Gibberella fujikuroi 67
Glass beads 431
'Glass' (ice-salt-protein solid) 150
(Letter) 265
β-Glucanase 259
Glucose biosensors 93, 260
β-Glucuronidase (GUS) (Letter) 266
Glutamine synthetase (GS) 406
Glycan–protein conjugates 221
Glycanase genes 260
Glycobiology 221
Glycocalyx matrix 138
Glycoconjugates 221
Glycoforms 338
Glycoproteins
'adhesive' 224
CD4 124, 307
function of 221, 346
gp120 127
immature 347
microheterogeneity of 222
of rabies virus 7
recombinant 338
tissue factor (TF) 354
transmembrane envelope 419
uromodulin 351
viral-envelope 307
viral spike, and cellular receptors 41
Glycosyl transferases: membrane bound 347
Glycosylation
and enzyme activity 259
and protein activity 348
control of 338
inhibitors 346
mutants 351
of antibodies 107
of factor VIII B-domain 354
sites 350
Gnann peptide 417
Graft rejection: and TNFs 161
Gram-negative bacteria
genus *Erwinia* 325
subgroups 19
Gram-positive bacteria: plasmid borne resistance to cadmium 20
'Green' chemicals 362
Green industry biotechnology platform (GIBiP) 299
'Green' politics 6
GroEL protein 45, 73, 368
GroES protein 45
Groove residues 404
Growth factor domains on serine proteases 86
Growth factors: transforming 78
Growth hormone: human 287
Growth regulation 159
'Guessmers' 146

H

Hapten NPN 170
H-DNA 342
Heat shock proteins 311
Heavy metal resistance genes: in bacteria 22
Helical folding: of antigenic peptides 238
Helical nucleation: in nascent proteins 239
α-Helix formation 238
Hemagglutinin–neuraminidase, intracellular transport of 350
Hemophilia A, treatment of 353
Heparan sulphate 225
Hepatocytes, study of 408
Hermes antigen 224
Herpes simplex virus
and FGF receptors 148
resistance to 71
High-mannose chains 347
High performance capillary electrophoresis (HPCE) 243
HIV antigens: in hybrid Ty-VLPs 305
HIV-1, resistance to 71
HIV inhibition 342
HIV therapeutic: CD4-Ig 112, 127
HLA antigens 403
Hoogsteen base-pairing 337
Hormone–receptor interactions 251
Horseradish peroxidase (HRP), transport of 286
Host-killing systems 278
HPLC 224, 243, 294
Human complement system 375
Human genome project 367
in Japan 185
Human growth hormone 287
Human IFN-γ: as therapeutic 369
Human insulin-like growth factor (IGF-1) 282
Human leukocyte associated (HLA) transmembrane molecules 403
Human protein C (hPC) 350
Human rabies 7
'Humanization': of antibodies 169, 375, 379
Humoral response 164
Hybrid enzymes 228
Hybrid hybridomas 376
Hybrid viruses 415
Hybridization: of nucleic acids 339
Hybridoma
and patenting 121
antigen-specific 109
cells in culture 320
cells, shear fragility of 432
hybrid 376
technology 169
Hydration: of enzyme 397
Hydrogels 206
Hydrogen bonding: between base pairs 339
Hydropathicity 164
Hydrophobic cores: of proteins 59

I

Ibuprofen 161
Ice nucleation 370
(Letter) 266
ICP expression 178
Idiotype–anti-idiotype interactions 114
IgG: human 378
(see also antibodies)
Illegitimate recombination 281
Immobilized cells 63, 280, 425

Immortalized cells 407
Immune defence 158
Immune intervention: CD4 targeted 124
Immune response 124
Immune stimulatory complexes (ISCOMS) 304
Immunity
in plants 108
to malaria 389
Immunization
of dogs against rabies 7
intracellular 71
Immunoassays 230
Immunoconjugates
ScFv fusion proteins 135
Immunoglobulin (IgG) molecule 113
and patenting 121
chemical modification of 16
variable regions 109, 124
Immunoliposomes 296
Immunosensors 260
Immunosuppressive agents 128
Immunotherapy: for cancer and infectious diseases 375
Inclusion bodies (IBs) 251, 368
Industrial applications
of catalytic antibodies 40
of *Erwinia* 328
lipases 360
Infection cycle
plasmodium 390
retrovirus 304
Inflammation 159
Infra-red fiber-optic sensor 425
Inheritance of plasmids: mechanism 273
Inhibitor of viral replication (IVR) 373
Inhibitors of *N*-linked oligosaccharide modification 349
Initiatives: in biotechnology 77
Interferon 406
Intravenous nutrition 362
Insect resistance: and transgenic plants 177, 197, 374
Insecticidal crystal proteins (ICPs) 177
Insecticide-resistant mosquitoes 389
Insertion mutants 31
Instrumental electrophoresis 243
Insulin
absorption of 286
antigenic sites 168
microsphere system 288
Integrated pest management 178
Integrins 225
Intellectual property 117, 151
protection 298
Interactive bottom-up approach 298
Interferon gamma (IFN-γ): human 369
Intergenic somatic hybrids 26
Interleukin-1 (IL-1) 250, 252
Interleukin-2 (IL-2) 250, 254
Interleukin-6 (IL-6) 406
Internal reflectance element (IRE) 142
International genefund 299
International patent law 117
Intertribal somatic hybrids 27
Intracellular immunization 71
Intracellular therapeutic agents 308
Investment: and life sciences 47
Ionization state: of enzymes 395
Iron: and bacterial virulence 312
Irritants, testing of 407
Isoelectric focusing 245
Isomorphism 4
Isopropylthiogalactoside (IPTG) 274
Isotachophoresis 245
Isotopic labeling: of DNA and DNA-binding proteins 103
Isotype 379

J
Japan, biotechnology in 183

K
Keratinocyte growth factor 147
Keyhole limpet haemocyanin (KLH) 170
Killer (effector) cells 375
Kinemage 293
Klenow fragment 136
Kolmogorov eddy 316, 429
Kringle domains: on serine proteases 86

L
lac-repressor headpiece 101
β-Lactamase production by *E. coli* 368
Lactate dehydrogenase (LDH)
release from damaged cells 320
storage under different conditions 372
Lactic acid bacteria 372
Lactoferrin 312
lacZ promoter 173
Lambda phage, combinatorial libraries in 40
Lambda Zap 171
Laminar shear stresses 427
Large unilamellar vesicles (LUVs) 269
Lariat structure 341
Laue diffraction 115
Lectin–carbohydrate based mechanism: in cell aggregation 66
Leukemia, possible treatment of 135
Leukocyte function antigens (LFAs) 224, 377
Leuteinizing hormone (LH) 408
Lewis base 383
Lichen 409
Lifshitz–Van der Waals interactions 385
Ligninolytic fungi 262
Lipases 360
in paper manufacture 361
Lipid–detergent micelles 42
Lipids, transbilayer distribution of 271
Lipocortin I 180
Lipoprotein: effect on adsorption 205
Liposomes 44, 268, 296
Livestock modification 5, 71, 374
Locoweed 349
Long interspersed elements (LINE) 303
Longitudinal hydrophobicity 240
Low-temperature unfolding (Letter) 266
Low-water environments: and lipases 360
Luciferase 72, 73, 229
Luciferin–luciferase: dipstick assays 74
Luminescent reactions 72
Luminol 73
Luminometers: development of 74
lux genes
Lymphocytes
and HIV CD4 receptor 342
$CD8^+$ 391
classes of 125
human peripheral 408
large granular 377
Lymphokine–receptor interactions 250
Lymphokines 250
production of 110
Lymphotoxin 158
Lyophilization 150, 370
(Letter) 265
Lysozyme (human)
hydropathicity 166
secretion of 209
structure of 202, 210
Lysozyme-immunized mouse 170

M
Macromolecules: entrapped in RVEs 44
Magnetic bacteria 91
and magnetite synthesis 148
Magnetic enzymes 92
Magnetized cells 93
Magnetosome membranes 91
Magnetotactic bacteria 91
Major histocompatibility complex (MHC) 164, 238, 403
Malaria parasite, life cycle of 390
Malaria vaccines 389
Mapping of protein sequence 166
Marine biotechnology 374
in Japan 185
Marker genes (Letter) 123
Mass spectrometry (MS) 244, 295, 339
MDV-1 RNA 54
Mechanical pulping 262
Media additives: and cell protection 316
Medium pressure extrusion procedure 269
Melanoma: human cell line A375 135
Melt-back: of ice (Letter) 266
Membrane channels 181
Membrane receptors 346
Membrane transport: in liposomal systems 268
Metabolic design 279
Metabolic engineering 226
Metabolism: of bacteria in biofilms 139
Metabolite production in mycelia 63
Metal affinity chelate partitioning 387
Metal corrosion: and sulphate reducing bacteria (SRB) 18
Metal reclamation using bacteria 23
Metal resistance: in bacteria 17
Methocells (MCs): in cell culture 321
MHC antigen 294
MHC Class I restriction 403
Micellar electrokinetic capillary chromatography (MECC) 245
Micelle formation: in viral envelopes 42
Microaqueous systems 395
Microbial insecticide 177
Microbial pathogenicity 309
Microbiological inventions, patentability of 118
Microcarriers 427
Microemulsions 395
Microenvironment: of enzymes 394
Microgradients: in biofilms 138
Microorganisms
and biofilm formation 138
deposit of 118, 151
genetically modified 6
metabolites from 409
Microprojectiles 94, 148
Missense mutations 355
Mitochondria and chloroplasts, combination of 29
Mixed cultures 322
Mixer–settlers 383
Mobility of molecules 46
Modification: of fats and oils 360
Modification of livestock: as food 5
Molecular audit 403
Molecular chaperones 208
Molecular cloning 224
Molecular partition 384
Monoclonal antibodies (mAbs) 418
against tumour antigens 134
and cancer therapy 375
and epitope mapping 127

and factor VIII epitopes 358
and patents 121
anti-CD4 128
anti-lymphocytic, therapeutic application of 296
B6.2 135
by repertoire cloning 169
humanized 379, 406
in AIDS therapy 124, 375
mimetics 404
to rabies glycoprotein 7
to subunits of pertussis toxin 235
87.92.6 404
Monogenic fungal cultures 413
Monophasic systems 382
Mono-S ion-exchange chromatography 355
Mortierella vinacae 67
Mouse
fibroblasts 407
myeloma cells 109
Mucociliary clearance mechanism 288
Multienzyme systems 226
Multimer resolution systems 277
Multi-wavelength anomalous diffraction (MAD) 4, 115
Mutagenesis
and protein stability 259
cassette 239, 252
DNA-directed 14
site-directed 62, 88, 127, 161, 211, 343, 347, 350, 355, 416
substitution 252
Mutagenicity testing 408
Mutant proteins 251
Mutant t-PAs 88
Mutations
in IFN-γ, differential solubility of 369
in plants, transposon induced 31
of the CF gene 48
Muteins 147
Mx defense systems 71
Myocardial infarction: acute (AMI) 81
Mycelial
aggregates 66
morphology 63
Mycobiont 410
Mycotoxin screening 408
Myeloid cells 377
Myeloma based expression: for large mammalian proteins 109
Myeloma protein 169
Myxobacteria msDNA 303

N

NAD-dependent dehydrogenases 344
Nanotechnology 148
Nasal delivery of compounds 284
Natural killer (NK) cells 159, 377
Natural product
patents 118
screening 409
Nature-identical products 338
Neo-vasculature 78
Nernst equation 269
Nerve growth factor: and patent claims 120
Newtonian fluid 64
Nitrogen-deficient habitats 411
Nitrogen fixation: in plants 79
N-linked glycans 221
N-linked oligosaccharides 346
NMR 96, 142, 210, 252, 395, 405, 425
determination of protein structure 115
studies of antigen–antibody interaction 40
study of barnase 259
to study DNA–protein interactions 96
to study molecular interactions 167
three-dimensional 103
two-dimensional 293, 339
NMR spectroscopy 96
NOESY spectra 100
Non-Newtonian fluids 63
Non-plasma-derived proteins 358
Nonsense mutations 51
N-terminal end rule 1
Nuclear magnetic resonance (see NMR)
Nuclear Overhauser effect (NOE) 97, 294
Nuclear Overhauser enhancement spectroscopy (NOESY) 97
Nucleases: site-specific 13
Nucleic acids
exponential amplification of 53
sequence detection 339
Nutrition modes in fungi 410
Null mutations 51

O

Oligonucleotide-directed mutagenesis 350
Oligonucleotides
analogues 341
as hybridization probes 145
separation 246
synthesis 341
Oligosaccharide-processing reactions 347
Oligosaccharides from t-PA 224
O-linked glycans 222
Oncogenes 406
'Oncomouse' patent 117, 154
On-line monitoring: of biofilm formation 425
On-line sampling: of fermenters 339
Operon: pertussis toxin 234
Opsonization 127, 379
Optic-fiber biosensor 93, 260
Oral vaccination: of wildlife against rabies 9
Organic chemical processes: and lipases 362
Organic reaction mechanisms 39
Organic solvents: and enzymes 395
Orthomyxovirus-resistance gene 71
out-dependent protein secretion 328

P

Packing energy: for large residues in protein interiors 60
Papain 192
Paper manufacturing 262
use of lipases in 361
Parallel bioreactor method 317
Paralytic poliomyelitis: vaccination 415
Parenteral nutrition 362
Partitioning processes 381
Patent law: and biotechnology 117, 151, 298
Patentability
of living matter 151
of replicating organisms 117
Patenting 117
in agricultural biotechnology 151
of life 117
plant genes 156
Pathogenesis-related (PR) proteins 373
PCR 49, 54, 133, 145, 170, 327, 337
and the construction of hybrid enzymes 259
diagnostic applications 55
technology 53, 109
use in making phage libraries 40
Pectinolytic enzymes 325
PEG
and magnetotactic bacterial spheroplasts 93
as protective media additive 316, 436
in separation systems 384
modified subtilisin 398
nasal absorption of 286
Pellets: mycelial 63
Penicillium 64
notatum 409
Peptide
bioassay 295
ligation 12
partitioning 385
synthesis 294
Peripheral blood leukocytes (PBLs) 379
Peroxycarboxylic acid formation 363
Pertussis vaccine 232, 314
Pesticide resistance 178
pH gradients 268
pH memory 395
Phage library, screening of 173
Phage vectors 172
Phagemid 171
Phagolysosome 312
Phase diagram 382
Phase problem, heavy atom solution of 4
Phosphoinositol lipid-linked glycoproteins 222
Phospholipase 180
Photobiont 410
Photodiode-array technology 244
Phytopathogenicity of *Erwinia* 326
Pigging 139
Plant-cell-wall degrading enzymes 325
Plant–pathogen interactions 325
Plant pathogens, control of 373
Plant protoplast culture 24
Plants
antibody expression in 107
gene transfer via somatic hybridization 24
transformation 197
transgenic: insect resistant 177
transgenic (Letter) 122
Plasma membrane fluidity (PMF) 319
Plasmid-borne heavy-metal resistance in bacteria 18
Plasmid-directed expression systems 251
Plasmid load 274
Plasmid loss, kinetics of 273
Plasmid multimers, formation of 275
Plasmids: broad-host-range 17
Plasmid stability, strategies for improving 279
Plasminogen 86
Plasmodium: and malaria 389
Platelet activation 353
Pluronics 316, 323, 433
Poliovirus antigen chimeras 415
Polyclonal antibodies 169
and patents 121
Poly(dA)-tailed capture probes 56
Polyelectrolyte polymers 191
Polyethylene glycol (see PEG)
Polyfunctional enzymes 227
Polygalacturonase (PG) gene: in tomato (Letters) 122, 267
Polygalacturonidase synthesis 67
Poly His 2
Polymer complexes 191
Polymer: phase forming 387
Polymer surfaces, properties of 201
Polymerase chain reaction (see PCR)

Polymorphic neutrophils (PMNs) 377
Polymorphism of malaria parasite 392
Polysomes 347
Polyvinylidine difluoride (PVDF) 224
Population screening: for CF 48
Post-phlebitic syndrome 82
Post-translational processing 223, 338
Pre-conception screening: for CF 49
Precursor processing 209
Pre-natal diagnosis: for CF 48
Principal neutralization determinant (PND) 419
Process inventions 119
Product inventions 119
Product purification: and protein fusions 2
Product separation 339
Programs for predicting antigenicity 165
PROSITE protein database 301
Proteases 360
  'damaged' 13
  viral 304
Protection mechanisms for cells in culture 317
Protein A 1, 196, 230
Protein adsorption to solid surfaces 201
Protein antigenic sites 163
Protein assembly 45
Protein
  chemistry 293
  databases 300
  design *de novo* 59
  folding 208, 238
  'pick-up' 307
  purification 230, 305, 339, 381
  stability 60, 149
Protein–detergent micelle structure 42
Protein–DNA interactions 96, 102
Protein engineering 59, 338, 351
  and mAbs 169
  in Japan 185
  of IFN-γ 369
  of lipase 361
  of signal sequences 208
  programme (LINK) 149
  to alter antibodies 39, 109
Protein fusions 1, 376
  applications of 2
  enzymes 226, 259
  therapeutic role of 3
Protein interiors, redesign of 59
Protein kinase C inhibitor (H7) 128
Protein–protein interactions 224
Proteins
  heat-shock 311
  non-plasma-derived 358
  separation of 248, 385
  solubility of 385
  temperature regulated 311
  therapeutic 374
Protein sequences: homologies and motifs 300
Protein Society 293
Protein structure
  determination 115
  methods for solving 4
  prediction 300
  unfolded 149
Protein–surface interactions 201
Proteinase inhibitors 198
Proteoglycans 222
Proteolysis 326, 403
Prothrombin generating complex 353
Protoplast fusion 24
Protropin 339
Pulping 262
Purification: of fusion proteins 2
  (see also protein purification)
Purple (Gram-negative) bacteria 19
P-450 proteins 229

Q
Quadroma 376
Q-beta replicase 53
Quinoprotein alcohol dehydrogenase 344

R
Rabies, control of 7
Rapeseed, increasing genetic diversity in 24
Readthrough transcription (Letter) 123
Real-time plasticity 338
Receptor–ligand systems 251
Receptor molecules for HIV 124
Recombinant DNA: and patent claims 120
Recombinant-DNA technology 89, 186, 279, 284, 309, 328, 353, 387, 408, 415
Recombinant
  bifunctional enzymes 230
  factor VIII 357
  genes 406
  glycoproteins 338
  human growth hormone 339
  IFN-γ 369
  lymphokines 251
  malaria vaccine 390
  mouse myeloma cells 406
  organisms 273, 279
  plant forms 373
  RNA probes 55
Recombinant proteins
  in heterologous hosts, stability of 45
  production of 279
  purification of 111
Recombinant (rabies) vaccine trials 10
Recombinant pertussis toxin subunits 234
Reconstituted viral envelopes (RVEs) 41
Red blood cells: containing bacterial magnetite 94
Redox catalysts 14
Refractive index 340
Regulation of oral (rabies) vaccine campaign 10
Regulatory proteins of HIV: Rev and Tat 342
Regulatory requirements: for antithrombotic treatment 85
Renal allograft rejection 162
Repertoire cloning 169
Replicatable RNA probes 56
Replicating organisms, patentability of 117
Replicons 273
Repressor–operator complex 101
Reptation mode of biopolymer migration 46
Research projects: in Japan 184
Resistance: in plants
  to hygromycin 33
  to insects 177
  to streptomycin 33
Resistance to *Phoma lingam*, transfer of 29
Resonance angle 340
Resonance in NMR 96
Restriction fragment length polymorphism (RFLP) 28, 48, 246, 327
Retroelement particles: as targeting vehicles 303
Retrotargeting 406
Retrotransposons 303
Retroviral particles 303
Reverse-phase
  evaporation procedures 269
  separations 246
Reverse pluronics 319
Reverse translation 145
Reversibly soluble polymers 191
Reynolds number 428
Rhizobium: and non-legume crops 79
Ribonuclease H 337
Ribosomal enzymes: in inclusion bodies 369
Ribosome-inactivating protein 147
Ribozymes 341
Risk assessment: and genetic manipulation 6
RNA: antisense–sense interactions (Letter) 266
RNA replicases: as diagnostics 53
RNA replication cycle 55
Robbins device 139
Rolling-circle replication 281
Royal Society of Chemistry 407
Rubisco, folding of 45

S
Sabin live attenuated oral poliovirus vaccine (OPV) 415
Salk inactivated poliovirus vaccine (IPV) 415
Salmonella spp., attenuated: as vector 393
Salting out 385
Sanger DNA sequencing protocols 246
Saporin 147
Scanning confocal laser microscopy (SCLM) 141
ScFvs as therapeutics 132
Schiff-base linkage 344
Screening
  for cystic fibrosis 48
  of phage library 173
Search algorithm 302
Seawater, recirculation of 374
Secretory proteins in yeast, folding of 208
Segregational instability of plasmids 273
Selectins 225
Selective breeding 7
Self assembly: of chaperonins 45
Semisynthetic antibodies 16
Sense transgenes (Letters) 122, 182
Separation
  of inclusion bodies 368
  of proteins 248
  processes 381
Septic shock: and TNFs 161
Sequence similarity 300
Serine proteases 86, 114, 353
Sessile cells: resistance to biocides 138
Severe combined immunodeficiency (SCID) 173
Shear forces
  in stirred fermenters 64
  and damage to cells in culture 316
Shear protectants 433
Shiga toxin 311
Shigella 310
Shine–Dalgarno sequence 278
Siderophores 312, 327
Sieving model for separation of biopolymers 46
Signal sequences 208
Single chain antibody variable regions (ScFvs) 132
Site-directed mutagenesis 62, 88, 127, 161, 211, 343, 347, 350, 355, 416
Slab electrophoresis 246
Sm–Co magnet 93

Snake-venom phosphodiesterase 341
Soft-rot 325
Solid–liquid separations 381
Solubilized cell-surface receptors 112
Somatic hybridization: and gene transfer in plants 24
Somatic incompatibility 25
Soya bean variety: patent application 155
Sparger design 435
Sphygmomanometers 115
Spinner flasks 431
SPR-based biosensor 340
Stable plasmids 259, 276
'Starling-flow' conditions 423
Start-up companies 367
Static-culture controls 317
Stereoselectivity 344
Steroid transformation 229
'Stiff' bubbles 435
Stirred-tank reactors (STR) 406, 427
Storage of biomolecules: undercooled vs. frozen 371
Stop-flow techniques 39
Streptavidin, expression in *E. coli* 3
Streptomyces 64
Strip-of-helix
  algorithm 165
  hydrophobicity index (SOHHI) 239
Subcellular compartments 148
Suicide proteins 280
Sulphate reducing bacteria (SRB) and metal corrosion 18
Surface charge: and partition 384
Surface energy 201
Surface plasmon resonance (SPR) 260, 339
Surfactants 362
  elutability 204
Surrogate surfaces 224
Swainsonine 349
Swarmer cell differentiation 310
SWISS-PROT protein database 301
'Switchback' 337
Symbiotic relationships 409
Synchrotrons 115
Synexin 180
Synthetic peptide vaccines 163
Synthetic peptides 148

T
Target-specific RVEs 43
Targeting: of protein and peptide drugs 295
Taxonomic classification: of Brassicaceae 25
T cells 377
  cytotoxicity 379, 403
  proliferative response 159
  receptor (TCR) 124
  response 164
  selection 125
T-DNA
  genes 373
  (Letters) 122, 182
Technology transfer 367
Temperature regulation: of *Yersinia* 311
'Tenase' complex 356
Tetanus toxoid (TT) 391
  antibodies 173
T-flask 317, 432
Therapeutic products
  microbial 409
  (see also drugs)
Therapeutic uses
  of CD4-Ig: for HIV 112
  of FGFs 147
  of TNFs and their antagonists 158
Thermodynamics: of phase separation 383
Thermoregulation in *Shigella* 310
Thermostability: of enzymes 259
Theta replication 281
Thiophene production 67
Third World biotechnology 297
Thrombin generation 353
Thromboembolic diseases, treatment of 80
Thrombolytics 80
Thuricide 197
Thymocyte reovirus type 3 receptor (Reo3R) 404
Tissue-culture-derived rabies vaccines 10
Tissue plasminogen activator (t-PA) 223, 296, 406
  and thrombolytic therapy 86
  in treatment of stroke 81
  redesign of 86
T lymphocytes 379
TNF antagonists: and therapy 158
Tobacco mosaic virus, resistance to 71, 373
Toxicity
  indications 288
  testing methods 407
t-PA (see tissue plasminogen activator)
Transcellular transport: of drugs 285
Transcriptional modulation (Letter) 123
Transferrin 312
Transformation methods: in crop plants 108
Transgene expression: of Mx proteins 71
Transgenes 6, 71
  (Letter) 266
Transgenic livestock 374
  disease resistant 71
Transgenic plants 5, 373
  and insect resistance 177
  (Letters) 122, 182
Trans-inactivation of genes (Letter) 266
Transition-state theory 39
Transmembrane envelope glycoprotein 419
Transmembrane helix 239
Transmembrane pH gradients 268
Transplantation studies 78
Transposable elements 31
  Tn 10 310
  (see also transposons)
Transposon-induced mutations: in plants 31
Transposon mutagenesis 327
Transposon tagging 31
Transposons: as tools for isolation of plant genes 31
Trental (pentoxifylline) 81
Triclopidine 84
Triple helix formation 337, 341
Triplex technology 341
Tris-kringle plasminogen activators 87
Trypsin inhibitor 196
Tryptophan-overproducing maize 154
Tryptophan synthase 60
Tuberculin 131
Tumour-infiltrating lymphocytes (TILs) 160
Tumour necrosis factors (TNFs) 158, 250, 378, 392
Tumours 78
  cell lysis 378
  imaging 135
  targeting: by antibodies or antibody fragments 132
Tunicamycin 349
Turbulence 428
Turbulent collision severity (TCS) 430
Two-component signal regulators 311
Two-phase systems 395
Ty element: of yeast 303

U
Ubiquitin fusions 1
Ultrafiltration 381
Ultramicrobacteria (UMB) 140
Undercooling 370
'Unexpected floating organisms' (UFOs) 424
Unfoldase enzymes 239
Unfrozen water 151
  (Letter) 265
'Unnatural' engineering 343
Urokinase plasminogen activator 86
Uromodulin 351

V
Vaccines
  against AIDS 129
  against cholera 393
  against malaria 389
  against rabies 7
  against whooping cough 232, 314
  anti-viral 163
  bacterial 314
  design and production of 309
  poliovirus: Sabin 1 415
  synthetic 163, 297
  Ty-VLPs 303
Vaccinia virus: as vector for rabies vaccine 7
Van der Waals contacts 62
Van der Waals–Lifshitz interactions 385
Vascular effects of TNFs 159
Vectors for genes 109
  bacterial 273
  from phage 172
  plasmids 279
  pUC 274
  SV40 306
Vegetative cells 140
Verax system 406
Vernalization 373
Vesicular membrane systems 268
Viable chimeric poliovirus 416
Video-microscopic techniques 42, 433
Viral antibodies: and patents 121
Viral envelopes
  glycoproteins 307
  reconstituted 41
Viral infection therapy: and lymphokines 250
Virulence determinants: and bacterial pathogenicity 310
Virulence genes: in bacteria 314
Virus infectivity, effect of tunicamycin on 349
Virus
  avian leukosis 71, 304
  Danish-bat 7
  Epstein–Barr (EBV) 169
  Hepatitis A (HAV), secondary structure of 168
  Hepatitis B 393
  Herpes simplex 71, 148
  human immunodeficiency (HIV) 124
  poliovirus 415
  rabies 7
  Rous sarcoma 306
  Sindbis 430
Virus-like particles (VLPs) 303, 406

Viruses, resistance to 71, 373
Viscometric studies 318, 432
Vitamin B_{12} 119
Vitamin C 325
Volume-shift-based biosensor 260
von Willebrand factor (vWF) 312, 353
Vroman effect 205

W
'Wake-up' nutrient 141
Wall-growth 422
Washout 274
Water activity (Letter) 265
Water-poor systems 394
Water structure 383
Water treatment 140
Watson–Crick base-pairing 337
Western blot 235
Wheatgerm agglutinin (WGA) 195
Whooping cough vaccines 232
Wound healing 147

X
X-ray crystallography 96, 115, 167
X-ray diffraction: and protein structure 4

Y
Yeast
  glycosylation system 351
  retrotransposon (Ty) 303
  secretory system 208
  sexual mating 351
Yersinia outer-membrane proteins (Yops) 311
Yield coefficient (Y) 424

Z
Zap, Lambda 171
Zinc-finger constructs 101
Zisman parameter 206
Z protein 307
Zymogen proteases 354
ZZ gene 386